

NJ_E Namibian Journal of Environment

**Environmental Information Service, Namibia for the Ministry of Environment,
Forestry and Tourism, the Namibian Chamber of Environment and the Namibia
University of Science and Technology.**

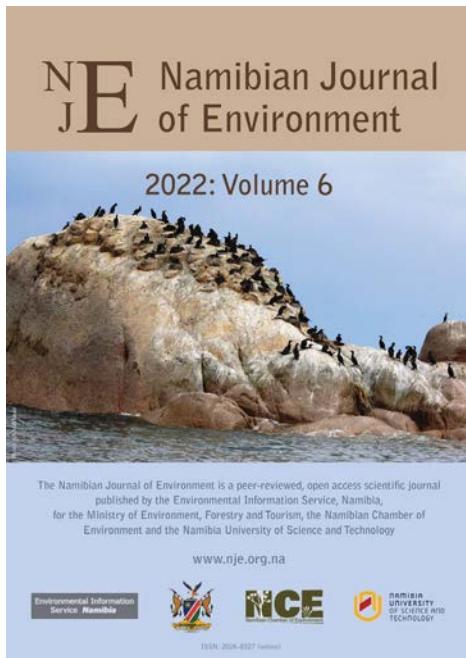
The *Namibian Journal of Environment* (NJE) covers broad environmental areas of ecology, agriculture, forestry, agro-forestry, social science, economics, water and energy, climate change, planning, land use, pollution, strategic and environmental assessments and related fields. The journal addresses the sustainable development agenda of the country in its broadest context. It publishes four categories of articles: **Section A: Research articles.** High quality peer-reviewed papers in basic and applied research, conforming to accepted scientific paper format and standards, and based on primary research findings, including testing of hypotheses and taxonomical revisions. **Section B: Research reports.** High quality peer-reviewed papers, generally shorter or less formal than Section A, including short notes, field observations, syntheses and reviews, scientific documentation and checklists. **Section C: Open articles.** Contributions not based on formal research results but nevertheless pertinent to Namibian environmental science, including opinion pieces, discussion papers, meta-data publications, non-ephemeral announcements, book reviews, correspondence, corrigenda and similar. **Section D: Memoirs.** Peer-reviewed monographic contributions and comprehensive subject treatments (> 100 pages), including collections of related shorter papers like conference proceedings.

NJE aims to create a platform for scientists, planners, developers, managers and everyone involved in promoting Namibia's sustainable development. An Editorial Committee ensures that a high standard is maintained.

ISSN: 2026-8327 (online). Articles in this journal are licensed under a [Creative Commons Attribution-Non Commercial-NoDerivatives 4.0 License](#).

Chief Editor: K STRATFORD

Editor for this paper: K STRATFORD



SECTION A: RESEARCH ARTICLES

Recommended citation format:

Hamutenya J, Hauptfleisch M, De Cauwer V, Fennessy J, Fennessy S & Nzuma T (2022) Understanding community attitudes toward the Angolan giraffe (*Giraffa giraffa angolensis*) and its potential reintroduction into Iona National Park, Angola. *Namibian Journal of Environment* 6 A: 47-56.

Cover photo: AB Makhado

Understanding community attitudes toward the Angolan giraffe (*Giraffa giraffa angolensis*) and its potential reintroduction into Iona National Park, Angola

J Hamutenya^{1,2}, M Hauptfleisch¹, V De Cauwer¹, J Fennessy², S Fennessy², T Nzuma¹

URL: <https://nje.org.na/index.php/nje/article/view/volume6-hamutenya>
Published online: 18th July 2022

¹ Biodiversity Research Centre, Namibia University of Science and Technology, PO Box 13388, Windhoek, Namibia.
jacksonshapumba@gmail.com

² Giraffe Conservation Foundation, PO Box 86099, Eros, Windhoek, Namibia

Date received: 8th March 2022; Date accepted: 23rd June 2022.

ABSTRACT

Wildlife introductions are often preceded by habitat suitability studies, although to date the possible impact of human communities' attitudes towards reintroductions of species have seldom been assessed in any detail. Iona National Park (NP) in Angola is inhabited by people, predominantly on the eastern fringes, and as such any reintroduction would benefit from the buy-in of these communities. Therefore, understanding community attitudes is essential for successfully reintroducing the Angolan giraffe (*Giraffa giraffa angolensis*) in Iona NP where the species has been locally extinct since before the 1980s due to indiscriminate poaching during the Angolan civil war. We undertook structured interviews of individuals (n = 82) from the Iona community living inside the park to: a) investigate their attitudes toward an Angolan giraffe reintroduction, b) understand people's willingness to co-exist with giraffe, and c) assess the risk of poaching. Our analyses revealed that whilst most people in the study area had never seen a live giraffe, they remained positive towards reintroducing them into the park. Only the minority Mungambwe and Mucubal ethnic groups, who are traditional agro-pastoral farmers, showed a neutral or negative attitude towards the reintroduction and were concerned about possible poaching of giraffe. The observed support by the majority of local communities for the potential reintroduction will be an advantage for conservation planners and managers moving this valuable conservation initiative forward.

Keywords: Angola, *Giraffa giraffa angolensis*, giraffe, Iona National Park, poaching, public attitudes, reintroduction

INTRODUCTION

Over the last three and half decades, giraffe (*Giraffa* spp.) populations throughout the African continent have declined by approximately 30% (Brown *et al.* 2021). In contrast, those in southern Africa are bucking this trend with some giraffe populations flourishing (O'Connor *et al.* 2019; Brown *et al.* 2021). With these positive trends in giraffe numbers in several parts of southern Africa, there is now the opportunity to explore their reintroduction into areas where they have become locally extinct. The vast areas of historical giraffe range, including Iona National Park (NP) in Angola, have not been re-established. Giraffe were known to have occurred in some areas of southern Angola until the 1980s (East 1999). Their local extinction was driven by anthropogenic factors, in particular indiscriminate poaching during the civil war that lasted more than four decades (Huntley & Russo 2019).

Following Angola's peaceful transition from the civil war in 2002, the country renewed its commitment to conservation (Mendelsohn & Mendelsohn 2018). With this renewed commitment, hunting is only allowed when permitted by the government. Also, a small number of extralimital South African giraffe

(*G. giraffa giraffa*) were translocated from South Africa into Kissama NP in 2017 (Marais *et al.* 2019). Whilst this was seen as a positive conservation effort by many, from a biodiversity perspective, it would have been more appropriate to reintroduce Angolan giraffe (*G. g. angolensis*) considering that this was their former natural range (Sarrazin & Barbault 1996). Efforts to re-establish demographically and genetically viable free-ranging populations of giraffe do not only benefit conservation (Muller *et al.* 2020; Lee *et al.* 2020), but also local communities through ecotourism. Since the local extirpation of Angolan giraffe from southern Angola, small-scale private conservation and tourism efforts have brought back giraffe (and other wildlife) to some private conservation areas but not to any state-run protected areas (Marais *et al.* 2019). There is concern that even if Iona NP's habitat was suitable, offering sufficient browse availability, the risk of poaching in the vast and under-resourced park might be a threat, especially as community perceptions toward giraffe were unknown. Historically, wildlife introductions have been preceded by habitat suitability assessments. However, the human dimensions of such introductions are often overlooked, inspite of the fact that most of the species were exterminated by humans or anthropogenic activities (Bencin *et al.*

2016; Glikman *et al.* 2022; Kansky *et al.* 2016; König *et al.* 2020; Koziarski *et al.* 2016; Malviya *et al.* 2022; Nyhus 2016). Human dimension of wildlife (HDW) studies were identified to cover socio-economic aspects of wildlife reintroduction (Bath 1989).

A review of existing literature revealed that HDW studies have been employed severally in assessing communities' attitudes and perceptions towards wildlife reintroductions (Bath 1989; Elizabeth *et al.* 2019; Miller 2009; Pate *et al.* 2016; Ruppert 2020; Glikman *et al.* 2022). Attitude surveys help to predict how people's attitudes could influence conservation policies and vice versa, allowing for more effective management and planning (Pamela & Lynn 1988). This approach has supported conservation managers in better understanding the local communities' opinions regarding the acceptance of conservation activities such as wildlife reintroductions. Importantly, HDW takes into account economic issues as well as attitudes and beliefs that can help wildlife managers to better understand the entire human component (Bath 1998). Understanding people's attitudes and perceptions prior to a specific proposal can help managers to predict where reintroductions may be supported by the communities versus where they would be hindered (Elizabeth *et al.* 2019; Kansky *et al.* 2016).

In general, implicit costs associated with conservation, such as crop damage and livestock predation by wildlife, have negative effects on local attitudes, in comparison to the perceived and real benefits from tourism, employment, and other livelihood opportunities (Nyhus 2016). Negative attitudes toward wildlife often encourage people to kill wild animals (Mir *et al.* 2015; Mogomotsi *et al.* 2020; Pamela & Lynn 1988), which over time can take a toll on conservation efforts. Negative interactions between people and wildlife not only have adverse effects on rural livelihoods but can also lead to negative attitudes toward wildlife conservation and general aversion toward wildlife resources (Bencin *et al.* 2016; Glikman *et al.* 2022; Kansky & Knight 2014; Koziarski *et al.* 2016; Malviya *et al.* 2022; Nyhus 2016). Such negative attitudes can undermine local, national, regional, and international conservation initiatives, but can also be used to plan for awareness programmes and other related conservation interventions ensuring their long-term viability. Bath (1989) further stated that people are likely to oppose species that may endanger human lives and their properties and accept those that do not pose any threat. Based on experience from other giraffe populations throughout Africa, the interactions between humans, livestock and giraffe can potentially result in some level of conflict generally known as Human-Wildlife Conflict (HWC) including crop raiding, bi-direction transmission of

pathogens, perceived forage competition and more (Fennessy *et al.* 2020). These scenarios are best assessed on a case-by-case basis before a reintroduction occurs to ensure long-term success.

Demographic characteristics of communities are also important predictors of attitudes toward species reintroductions (Deruiter & Donnelly 2002; Kansky *et al.* 2016). For example, race, sex, age, income, and educational level can influence people's attitudes toward wildlife. Mir *et al.* (2015) found that women, older people, people with a lower education level, people working in a natural-resource-dependent profession, or people living in a rural area within a carnivore distribution range tend to have more negative attitudes. Similarly in Kenya, the elderly were unhappy with African savanna elephants (*Loxodonta africana*) that raid their crops (Weinmann 2018). It is therefore important for wildlife managers to have information on each of these components and the interactions between humans, wildlife populations, and habitat to maximise a successful wildlife reintroduction (Elizabeth *et al.* 2019).

The recent increase of people in and around Iona NP highlights the importance of a HDW assessment to document and better understand the communities' attitudes and perceptions regarding a potential giraffe reintroduction. As such, the main objectives of the study were to analyse residents' willingness to co-exist with giraffe, and to understand their attitudes towards reintroduction and the risk of giraffe poaching. These results will be used to inform any decisions regarding a potential reintroduction of giraffe into Iona NP in Angola.

METHODS

Study area

The study was conducted in Iona NP, located in the Namibe Province in the arid extreme south west of Angola (Mendelsohn & Mendelsohn 2018). The 15,150 km² park is bounded by the Curoca River to the north and the Cunene (Kunene) River to the south, which also forms the national border with Namibia. The Atlantic Ocean borders Iona NP to the west, whereas the Otchifengo Valley defines its boundary to the east. As some parts of the park are extremely inaccessible, Iona NP has not been completely de-mined especially in the far-east since the civil war (Landminesinafrica 2017). As such, the interviews were conducted along key access routes to the Iona village, which is located near a potential giraffe reintroduction site (Figure 1). There are several villages in the park, however, Iona is the largest and fastest growing settlement in the park, and the only village comprised of residents from many ethnic groups (Morais *et al.* 2019).

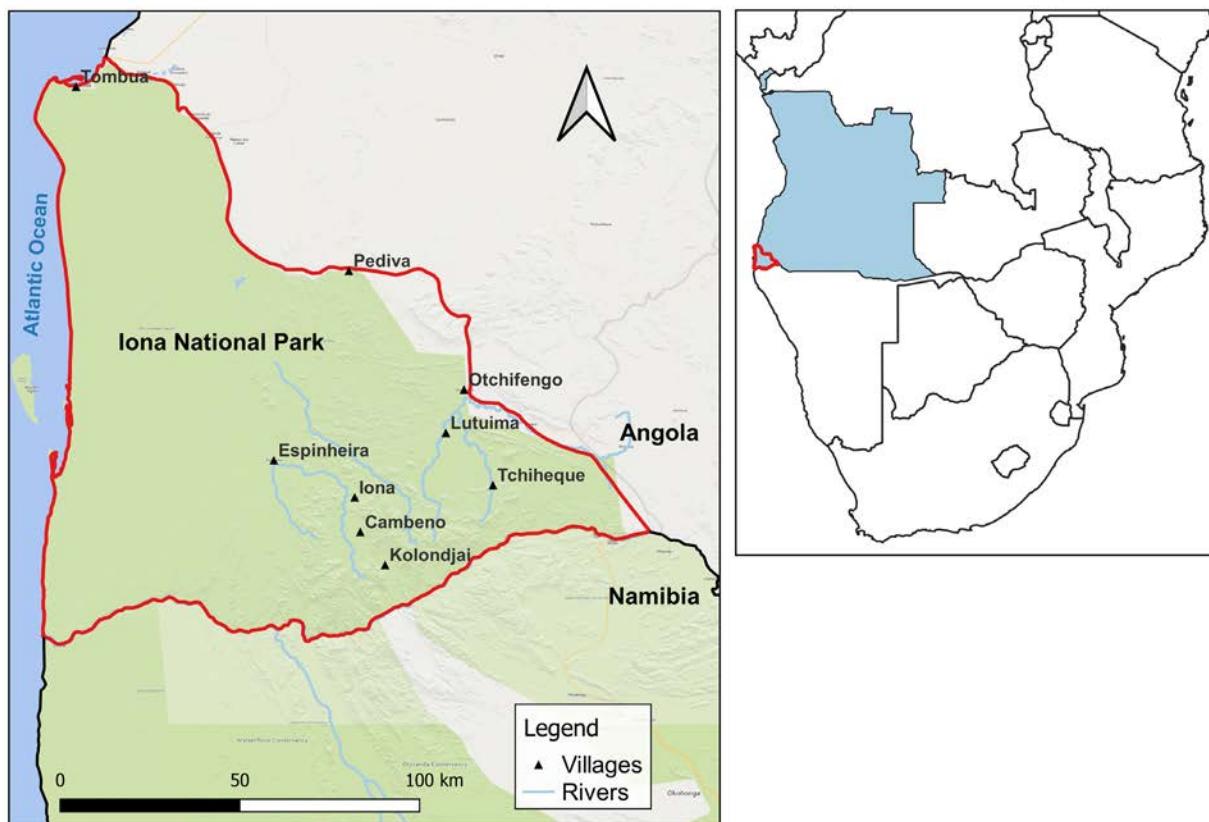


Figure 1: Map of Iona National Park and those communities within its boundaries, southwest Angola.

The study area is mainly inhabited by traditional pastoral or agro-pastoral communities that initially concentrated along the eastern and southeastern boundary (Curoca and Cunene Rivers) of the park. In the 1970s, 300 people were recorded living inside the park. This number increased to ~3,385 individuals in 2016, at which time 2,311 or 68% of the park's population had settled in Iona village (Mendelsohn & Mendelsohn 2018; Ministério do Ambiente 2015). Dairy products make up a major component of the population's diet, and the need for cattle enclosures close to dwellings has led to a relatively scattered settlement pattern.

Data collection

In October 2019, face-to-face closed-ended questionnaires (Table 1) were used to assess local community members' attitudes towards a proposed reintroduction of Angolan giraffe into Iona NP. For developing the interview questions, colleagues working in other parts of Africa on various aspects of HDW related to giraffe were consulted to ensure relevance and appropriateness. Access to the park and ethical clearance for the surveys were provided by the park authority through the EU funded transboundary SCIONA project (<http://sciona.nust.na>). The questionnaires were administered opportunistically to individuals with the only sampling criterion being those who were logically

accessible and willing to answer. Each interview lasted about 25 to 30 minutes. Due to poor infrastructure in southern Angola, and a latent post-war threat of anti-personnel mines, it was not possible to access a wide geographical area or introduce a randomised survey design. Interviews were conducted in English and translated as appropriate into Portuguese and/or Ojihirero through local interpreters (two post-graduate students and a park ranger at different times).

Individuals were interviewed either at their house or a previously identified location in the village (e.g. at the waterholes). Before conducting the interviews, consent was obtained from all respondents and they were informed that all their responses will remain anonymous. A multiple Likert scale questionnaire was used to collect the data (Likert 1932). The Likert scale is broadly used as a rating scale that requires respondents to indicate their degree of agreement or disagreement (Kroonenberg & Greenacre 2004; Gyimah 2016). Question statements and measured variables are presented in Table 1.

The interview targeted adults, both men and women covering young adulthood (18-35 years; n = 45), middle age (36-55 years; n = 26), and older adulthood (56 years and older; n = 11). All responses were recorded on a Huawei tablet device using the survey software Epicollect5 App (Mathews & Flynn

Table 1: Question statement and variables measured during the HDW community surveys in Iona NP, Angola.

Demographics	Variables	MCP map variables
Gender	Male, Female	Gender
Age group	18-25, 26-35, 36-45, 46-55, 56-65, > 65	Age group
Ethnicity	Himba, Curoca, Mungambwe, Kimbari, Mucubal, Other	Ethnicity
Employment	Herder, Hunter-gatherer, Unemployed, Crop farmer, Livestock trader	Employment
Education	Pre-primary to 6, Grade 7-9, Grade 10-13, None	Education
Respondents' attitudes towards the presence of wildlife and benefits received from them		
Do you enjoy having wildlife in this area?	No, Yes	
Do you receive benefit from wildlife of any kind?	No, Yes	
Encounter or experience with giraffes		
Have you seen giraffe in your area before?	No, Yes	
Respondents' knowledge and views on the potential reintroduction of giraffe to the area		
Do you recommend the reintroduction of giraffe in this area?	No, Yes	Reintroduction (1)
It is possible to reintroduce giraffe in this area?	Not likely, Somewhat likely, Unsure, Likely, Very likely	Reintroduction (2)
It is possible for both people and giraffe to live together in this area	Not likely, Somewhat likely, Unsure, Likely, Very likely	Co-exist
Do you think that giraffe will have impact (s) on other wild animals or livestock?	No, Not sure, Yes	
Respondent's views on the potential poaching of reintroduced giraffe in Iona National Park		
People would kill giraffe if they were in this area.	Strongly agree, Agree, Undecided, Disagree, Strongly disagree	Poaching (1)
How likely giraffe would be killed for bushmeat?	Not likely, Somewhat likely, Unsure, Likely, Very likely	Poaching (2)
How likely giraffe would be killed because of competition with livestock?	Not likely, Somewhat likely, Unsure, Likely, Very likely	Poaching (3)
How likely giraffe would be killed for (cultural) practices?	Not likely, Somewhat likely, Unsure, Likely, Very likely	Poaching (4)
Most people in this area would not be happy if someone killed a giraffe.	Strongly agree, Agree, Undecided, Disagree, Strongly disagree	Poaching (5)
Most people in this area would not be happy if someone killed a giraffe.	Strongly agree, Agree, Undecided, Disagree, Strongly disagree	Poaching (6)
Resident's views on legality and motivation for hunting		
If someone is found hunting how likely would they be arrested?	Not likely, Somewhat likely, Unsure, Likely, Very likely	
If someone is found hunting how likely would they be fined?	Not likely, Somewhat likely, Unsure, Likely, Very likely	
If someone is found hunting how likely would they be beaten?	Not likely, Somewhat likely, Unsure, Likely, Very likely	

2018). The software allows the user to record a GPS point location, automatically records time, date and allows easy exporting of data into MS Excel for data processing and cleaning (Mathews & Flynn 2018). The direct data entry helps to limit additional human error from data transcription. To reduce potential external influences and biases in answers during the interviews, respondents were asked not to discuss anything from the interview with others who were yet to be interviewed (Sampson et al. 2019), or were asked to stay with the researchers until all other people were interviewed.

Data analysis

All quantitative data were analysed using descriptive statistics and performed in XLSTAT (www.xlstat.com). Multiple Correspondence Analysis (MCA) was used to assess the association between response categories and sociodemographic variables. A Chi-square test was used to assess the effect of all demographic variables.

RESULTS

Respondent demographics

Eighty-two individuals, 65 males (79%) and 17 females (21%), were interviewed in and around Iona village. The highest proportion of respondents were 26-35 year olds (37%), followed by 36-45 years (24%), 18-25 years (18%), 56-65 years (10%), 46-55 years (7%) and > 65 years (4%). With respect to ethnicity/tribes, the majority were Himba (Ovahimba) ($n = 55$; 67%), followed by Curoca ($n = 22$; 27%) and then low numbers of Mungambwe ($n = 2$; 2%), and Kimbari, Mucubal and Other (each $n = 1$; 1%, respectively). Sixty-three individuals (77%) identified as herders (cattle, goats, sheep and/or donkeys), nine (11%) as hunter-gatherers, five (6%) as unemployed, four (5%) as crop farmers and only one (1%) as a livestock trader. Most of the respondents had never attended school ($n = 67$; 82%), with only nine (11%) individuals holding pre-primary to Grade 6 qualifications, and three (4%) each attending Grade 7-9 and Grade 10-13, respectively.

Respondents' attitudes towards the presence of wildlife and benefits received from them

Almost all respondents ($n = 79$; 96%) were happy to live with wildlife, with only a few exceptions ($n = 3$; 4%). The majority ($n = 68$; 83%) of respondents indicated that they do not receive any benefit of any kind from wildlife, whilst 14 (17%) individuals indicated they had have received minor benefits from tourists taking photographs with them. When the latter was tested against demographic variables, a significant difference was detected across age groups ($\chi^2 (12)$, $df = 5$, $p < 0.015$), whereby individuals aged 26-35 years mostly reported benefits.

Respondents' knowledge and views on the historical presence and potential reintroduction of giraffe to the area

Almost all interviewed respondents ($n = 80$, 98%) had never seen a giraffe; only 2 (2%) individuals had seen one in the area and both more than 30 years ago. When asked whether they support a future giraffe reintroduction, the majority ($n = 80$, 98%) said 'Yes' and only two (2%) responded 'No'. Ovahimba tribe showed a more positive attitude towards a potential giraffe reintroduction. The majority of respondents expressed a willingness to live with giraffe if introduced ($n = 71$; 86%), with nine (11%) being unsure, and two (2%) responded as somewhat likely. The results showed that there were significant differences across the ethnic groups ($\chi^2 (18.3)$, $df = 10$, $p < 0.008$) with Ovahimba people responding more positively to the prospect of living with giraffe. When asked whether they thought that

giraffe would have any impact on livestock or other wildlife, almost two-thirds ($n = 53$, 65%) of the respondents were unsure, approximately a third (25, 31%) said 'No', and only four (5%) responded 'Yes', showing that only a few respondents thought that giraffe will impact other animals.

Respondents' views on the potential poaching of reintroduced giraffe

With respect to the poaching risk, more than two-thirds ($n = 57$, 70%) indicated that giraffe would not be poached if they were in the area, whilst a fifth ($n = 17$; 20%) remained neutral or 'undecided', and only eight (10%) thought they will be poached.

The respondents' attitudes on how likely giraffe would be poached for bushmeat showed that a little more than half ($n = 47$, 57%) of the individuals feel it is unlikely. A total of 24 (29%) of respondents were unsure, nine (12%) individuals expressed it was somewhat likely and only two (2%) felt it was likely. Interestingly, 24 people were unsure, indicating that they didn't know whether giraffe meat was edible. The responses to this statement were significantly different across age groups ($\chi^2 (25)$, $df = 15$, $p < 0.037$). Individuals aged 26-45 years and those who never attended school were against killing giraffe for bushmeat. The majority ($n = 68$; 83%) of respondents felt that competition between livestock and giraffe would not be likely and thus not a reason for killing them, a small number ($n = 13$; 16%) was unsure and only one (1%) responded as likely. A highly significant difference between demographics was detected across ethnic groups ($\chi^2 (18.3)$, $df = 10$, $p < 0.0001$), and educational level ($\chi^2 (12.6)$, $df = 6$, $p < 0.0001$). The Ovahimba held more positive attitudes than others that it was unlikely giraffe would be killed as competitive herbivores to livestock, as well as a more positive attitude than respondents without school education.

The respondents were mostly optimistic that giraffe would not be killed for cultural practices – little more than half ($n = 45$, 55%) stated that it would not be likely, a third ($n = 28$; 34%) were unsure, and a low number ($n = 9$, 11%) responded somewhat likely. The majority of respondents ($n = 70$; 85%) agreed that people would not be happy if someone killed a giraffe, whilst six (7%) individuals were neutral (undecided), and six (7%) disagreed.

Residents' views on legality and motivation for hunting

This section aimed at understanding residents' knowledge towards law enforcement and their motives to hunt wildlife despite Angolan laws and regulations. Almost all respondents ($n = 80$; 98%) indicated that hunting wildlife was illegal.

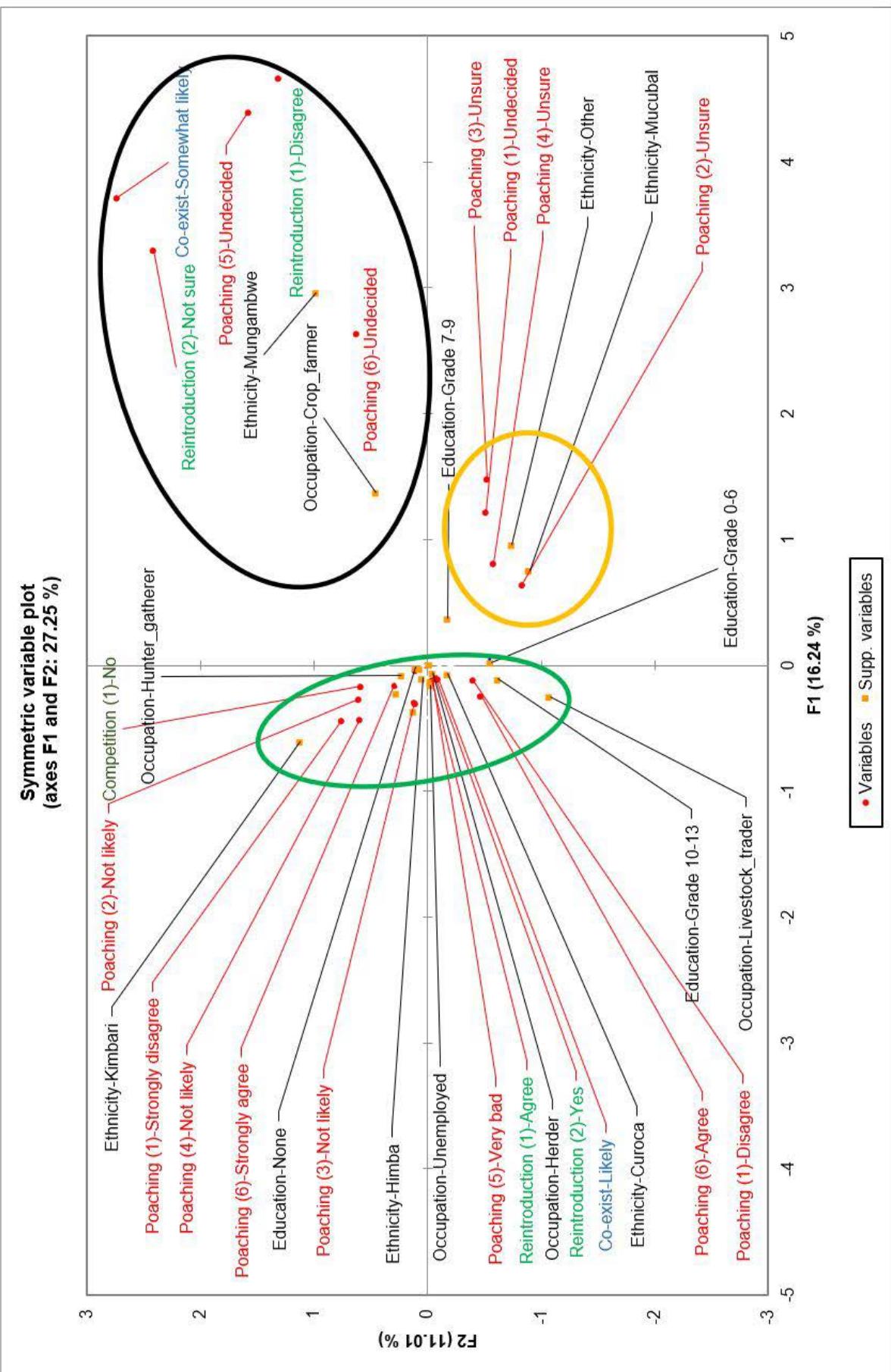


Figure 2: Multiple Correspondence Analysis of respondents towards response questions of giraffe reintroduction, co-existence and poaching risk in Iona National Park, Angola.

Respondents were asked if they were made aware that hunting of wildlife was prohibited, and how likely it was that people would still hunt. Almost half ($n = 39$; 48%) responded as somewhat likely, 29 (35%) individuals were unsure and a further 14 (17%) stated as not likely. Those that answered "somewhat likely" were further asked to briefly explain why people will still hunt regardless of regulations. Some responded that poaching would occur due to hunger, whilst others said that only carnivores are hunted simply because they prey on their livestock. A significant difference to this response was detected across occupations whereby herders ($\chi^2 (15.5)$, df = 8, $p < 0.037$) showed a negative attitude towards poaching.

Respondents were asked three questions about different law enforcement measures applied by conservation officials in Angola regarding poaching (illegal hunting):

1) If someone is found hunting how likely would they be arrested?

Almost all ($n = 79$; 97%) respondents believed that it is highly likely or likely, while three (3%) were unsure. The Ovahimba showed a more positive response which was statistically significant ($\chi^2 (25)$, df = 15, $p < 0.0001$) that poachers were very likely to be arrested.

2) If someone is found hunting how likely would they be fined?

Approximately two-thirds ($n = 53$; 64%) of respondents were unsure, with 22 (27%) mentioning that it is unlikely and seven (9%) responded as somewhat likely.

3) If someone is found hunting how likely is it that they would be beaten?

More than half ($n = 49$; 59%) of the respondents were unsure, whilst 31 (39%) indicated not likely, and only two (2%) considered the possibility as very likely.

Results of a holistic Multiple Correspondence Analysis

The graphical results of the MCA used to uncover the interrelationships between response categories of a set of questions and explanatory demographic variables in the survey is presented in Figure 2. Respondents who support reintroduction are located left (with positive views) on the upper and bottom (green circle). This group also contained those who opposed poaching and were willing to co-exist with giraffe. On the right upper side (black circle) are the individuals exhibiting negative attitudes towards giraffe reintroduction, have positive attitudes to

poaching and were not willing to co-exist with them. On the right lower quadrant (orange circle) lies respondents who were neutral towards a reintroduction, poaching and co-existing with giraffe.

All groups (Ovahimba, Curoca, herders, unemployed and those who did not attend school), with the exception of the Mungambwe and Mucubal ethnic groups, expressed positive attitudes towards a giraffe reintroduction and negative attitudes toward poaching (Figure 2).

DISCUSSION

The key findings from this study revealed a high level of support from the Iona communities towards a potential giraffe reintroduction into the park. Inspite of a majority of the respondents not knowing the giraffe physically nor having any knowledge regarding the impacts giraffe are likely to have on other wild animals or livestock, almost all interviewed (98%) reacted positively towards a potential reintroduction of the animal to the park. This was likely a result of their background knowledge that giraffe are not a carnivore and as such pose no livestock predation possibility. Similarly, there was a high willingness of the Iona community to co-exist with giraffe (96%), although only a few individuals (26–35 years old) indicated they had received minor monetary benefits from tourists who take their photographs but did not receive any such benefit from the presence of wildlife in the area.

A significant difference in attitude was detected between ethnic groups, with the dominant Ovahimba being most positive towards both the proposed reintroduction as well as willingness to co-exist with giraffe. The MCA revealed that individuals who never attended school as well as the herders, were all strongly supportive towards a giraffe reintroduction. With the legacy of the traditional Ovahimba pastoralist society, the most dominant tribe in the park, 82% of those interviewed never attended school but rather herd their livestock (Ministério do Ambiente, 2015). According to Malviya *et al.* (2022), education has been found to have a bearing on an individuals' acceptance to wildlife reintroduction and the success of conservation programs, with more educated people being more pro-conservation. However, in the case of this study, it can be assumed that people answered based on indigenous knowledge of the species being harmless. The limited few who indicated a negative attitude were from the traditional agro-pastoral Mungambwe tribe. It is likely they assumed that HWC would result from the introduced giraffe raiding their crops. However, giraffe rarely raid crops (Ruppert 2020), though in Niger they do seasonally feed on cowpeas and mangoes (Sogbohossou *et al.* 2013); none of which are grown in Iona NP. It is also unlikely that the low density of

crops in Iona would attract giraffe unless extreme droughts are experienced. Importantly, community awareness, education and monitoring will be necessary pre-, during, and post- any proposed reintroduction to dispel such concerns, and manage any potential HWC results.

The positive views expressed towards living with wildlife in Iona NP, with herbivores preferred over carnivores, highlights the positive relationship the Ovahimba people have with their environment. This situational carnivore related conflict has been reported in other studies. For example, the loss of crops by megaherbivores, or loss of livestock as they became food for carnivores had affected the socio-economic needs of the Maasai people (Bencin *et al.* 2016). It has been observed that if individuals' personal livelihoods are threatened by wildlife, they become less supportive of it, and more supportive when conflict is unlikely (Røskift *et al.* 2007; Bath 1989; Ryo *et al.* 2014). Some residents of Yellowstone NP, USA opposed grey wolves (*Canis lupus*) on the basis that they depredate on their livestock (Bath 1989). In Japan, residents were unhappy to live with wild boar (*Sus scrofa*) and sika deer (*Cervus nippon*), because they caused frequent agricultural damage (Ryo *et al.* 2014). Similarly, in Kenya, the interviewed communities were unhappy with the African savanna elephant that raided their crops (Weinmann 2018).

Knowledge of wildlife regulations and their enforcement likely plays a valuable role in local-level conservation. Encouragingly, almost all interviewees (98%) were aware that hunting is prohibited. However, despite this knowledge, a minority still indicated that they might revert to poaching. It appears that the driving forces behind poaching in Iona were diverse, but they were mainly driven by poverty and hunger, especially after much of their livestock died during the recent drought. Some people resort to poaching because of negative human attitudes around wildlife (Kahler & Gore 2015). Some poach for avoidance of future HWC or to prevent economic loss (Williams *et al.* 2017). Provision of bushmeat for subsistence or commercial use can also be a driver (Ruppert 2020; Kahler & Gore 2015; Grey-ross *et al.* 2010; Bennett *et al.* 2017). However, due to food aid donated to Iona residents from the government and local businesses, coupled with the fear of law enforcement, the prevalence of bushmeat poaching in the park has declined markedly (Iona NP park rangers pers. comm.). Furthermore, there are legal measures in place to deal with poachers e.g. warrant of arrest, and in serious instances it was reported by park rangers that poachers were beaten if they refused to cooperate with law enforcement. Ruppert (2020) stated that increased law enforcement and prosecution in

northern Kenya deterred poaching and other harmful activities towards wildlife.

It is important to note that giraffe in Angola are fully protected and any attempt to kill them is illegal (Ministério do Ambiente 2015). According to a study by Dunn *et al.* (2021), giraffe are hunted both legally and illegally, country dependent, with the use of their body parts varying geographically. In southern Africa, giraffe were mostly killed legally for bushmeat and trophies, although some local subsistence poaching was reported (Dunn *et al.* 2021). Concerns around potential poaching of giraffe introduced to the study area appeared minimal, although the feelings expressed around their use for cultural practices would need targeted monitoring and education amongst the residents (Glikman *et al.* 2022). It was reported by the community members interviewed that giraffe tails were used historically as a whip for horse riders while their skins were used for clothing and shoes. However, such concerns were repressed by other Iona community members remarking that this would be unlikely in this era as animal skins previously used for clothes are being replaced by modern fabrics often donated to them by the government.

Across the border in Namibia, important consumptive and non-consumptive livelihood benefits for the last few decades have accrued to community members who live with and conserve wildlife in registered conservancies through the community based natural resources management (CBNRM) programme (NACSO 2016; Naidoo *et al.* 2011; NACSO 2019). The CBNRM programme in Namibia and Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) programme in Zimbabwe are both mechanisms which have enabled local communities to manage and conserve their local wildlife resources, and in turn gain financially from sustainable non-consumptive and/or consumptive use (Nuulimba & Taylor 2015). In areas of northern Kenya where communities receive benefits, residents tend to support conservation and are more likely to tolerate negative impacts wildlife such as livestock depredation (Ruppert 2020). However, within the Iona NP there are seemingly few or no community benefits from wildlife or associated tourism. It is thus in the best interest of the Angolan government as well as the community living in and around Iona NP, that programmes with benefit mechanisms like the above cited are assessed and implemented to engage these communities in the long-term.

CONCLUSION

We demonstrated that the majority of interviewed community residents in Iona NP are in favour of giraffe being reintroduced. As local communities

experience the direct cost of living alongside wildlife, it is critical that they are involved in their management and benefit from wildlife and forestry products through local CBNRM programmes. A basic understanding and general positive attitude towards conservation was observed in Iona NP. By assessing and better understanding the HWD with regards to giraffe management in Iona, and more generally throughout the continent, the long-term viability of giraffe (and other wildlife) conservation efforts can be assessed better. Due to the low level of formal education in the area, we recommend programs for increasing awareness about conservation among the local communities. These conservation education programs should take advantage of traditional beliefs and highlight the ecological, economic and social benefits of wildlife. This study provides valuable insights into further decision-making regarding a potential reintroduction of Angolan giraffe into Iona NP. It is important to note that an ecological feasibility assessment is critical to inform the process. This should involve all stakeholders, including representatives from government, NGOs, academia and relevant communities, to make appropriate decisions on the feasibility of reintroducing giraffe. We believe that this study provides a valuable initial contribution towards the potential reintroduction of giraffe and other species currently locally extinct in Iona NP in Angola.

ACKNOWLEDGEMENTS

The authors would like to thank the staff of Iona NP, in particular Sango De Sa, Park Manager, and Cassute Maximino, Park Ranger. We thank Mitchitalele Tchundiro and Tchafeleni Albano for assisting in the field. Additionally, our thanks go to Dr. Monica Bond and Dr. Christian Kiffner for their constructive comments which greatly improved the manuscript. We also thank Giraffe Conservation Foundation (GCF) for their time and support during the writing up this paper. Lastly, we thank all the local community members who voluntarily took part in the focus groups and interviews. This project was funded by the European Union (EU) under the Skeleton Coast-Iona Transfrontier Conservation Area (SCIONA TFCA) project, grant agreement FED/2017/394-802 and the Namibian Chamber of Environment (NCE).

REFERENCES

- Bath AJ (1989) The public and wolf reintroduction in Yellowstone National Park. *Society & Natural Resources* 2(1): 297–306.
- Bath AJ (1998) The role of human dimensions in wildlife resource research in wildlife management. *Ursus* 10: 349–355.
- Bencin H, Kioko J, Kiffner C (2016) Local people's perceptions of wildlife species in two distinct landscapes of Northern Tanzania. *Journal for Nature Conservation* 34: 82–92.
- Bennett NJ, Roth R, Klain SC, Chan K, Christie P, Clark DA *et al.* (2017) Conservation social science: Understanding and integrating human dimensions to improve conservation. *Biological Conservation* 205: 93–108.
- Brown MB, Kulkarni T, Ferguson S, Fennessy S, Muneza A, Stabach JA, Fennessy J (2021) Conservation Status of Giraffe: Evaluating Contemporary Distribution and Abundance with Evolving Taxonomic Perspectives. *Imperiled: The Encyclopedia of Conservation* 1–17.
- Deruiter DS, Donnelly MP (2002) A qualitative approach to measuring determinants of wildlife value orientations. *Human Dimensions of Wildlife* 7: 251–271.
- Dunn ME, Connor DO, Veríssimo D, Ruppert K, Glikman JA, Fennessy S, Fennessy J (2021) Investigating the international and pan-African trade in giraffe parts and derivatives. *Conservation Science and Practice* 1–18.
- East R (1999) African Antelope Database 1998. IUCN/SSC Antelope Specialist Group. In *IUCN/SSC Antelope Specialist Group*. IUCN, Gland, Switzerland and Cambridge, UK. x +434pp.
- Elizabeth HT, Miljanich CP, Anderson SE, Hiroyasu EHT, Miljanich CP, Anderson SE (2019) Drivers of support: The case of species reintroductions with an ill-informed public. *Human Dimensions of Wildlife* 24(5): 401–417.
- Glikman JA, Frank B, Bogardus M, Meysohn S, Sandström C, Zimmermann A, Madden F (2022) Evolving Our Understanding and Practice in Addressing Social Conflict and Stakeholder Engagement Around Conservation Translocations. *Frontiers in Conservation Science* 3: 1–6.
- Grey-ross R, Downs CT, Kirkman K (2010) An assessment of illegal hunting on farmland in KwaZulu-Natal, South Africa: Implication for oribi (*Ourebia ourebi*) conservation. *African Journal of Wildlife Research* 40(1): 43–52.
- Gyimah I (2016) *Understanding the attitudes and perceptions of South African residents towards anti-rhino poaching initiatives*. Masters degree, University of South Africa.
- Huntley BJ, Russo V (2019) Biodiversity of Angola. In: Huntley BJ, Lages VRF, Ferrand NB (Eds.) *Biodiversity of Angola Science and Conservation: A Modern Synthesis*. pp. 1–11. Springer Nature, Switzerland AG.
- Kahler JS, Gore ML (2015) Local perceptions of risk associated with poaching of wildlife implicated in human-wildlife conflicts in Namibia. Local perceptions of risk associated with poaching of wildlife implicated in human-wildlife conflicts in Namibia. *Biological Conservation* 1–9.
- Kansky R, Kidd M, Knight AT (2016) A wildlife tolerance model and case study for understanding human-wildlife conflicts. *Biological Conservation* 201: 137–145.
- Kansky R, Knight AT (2014) Key factors driving attitudes towards large mammals in conflict with humans. *Biological Conservation* 179: 93–105.
- König HJ, Kiffner C, Kramer-Schadt S, Fürst C, Keuling O, Ford AT (2020) Human-wildlife coexistence in a changing world. *Conservation Biology* 34(4): 786–794.
- Koziarski A, Kissui B, Kiffner C (2016) Patterns and correlates of perceived conflict between humans and large carnivores in Northern Tanzania. *Biological Conservation* 199: 41–50.
- Kroonenberg PM, Greenacre MJ (2004) Correspondence Analysis. In *Encyclopedia of Statistical Sciences*.
- Landminesinafrica (2017) The Month in Mines, August 2017. Retrieved from Landmines in Africa website: <https://landminesinafrica.wordpress.com/tag/namibia/> on 18 August 2020.

- Lee DE, Fienieg E, Van Oosterhout C, Muller Z *et al.* (2020) Giraffe translocation population viability analysis. *Endangered Species Research* 41: 245-252.
- Likert R (1932) A technique for measurement of attitudes. *Archives of Psychology* 140: 5-55.
- Malviya M, Kalyanasundaram S, Krishnamurthy R (2022) Paradox of Success-Mediated Conflicts: Analysing Attitudes of Local Communities Towards Successfully Reintroduced Tigers in India. *Frontiers in Conservation Science* 2: 1-16.
- Marais A, Fennessy J, Fennessy S, Brand R, Carter K (2020) *Giraffa camelopardalis ssp. angolensis (amended version of 2018 assessment)*. The IUCN Red List of Threatened Species 2020: e.T88420726A176393590. <https://dx.doi.org/10.2305/IUCN.UK.2020-3.RLTS.T88420726A176393590.en>. Accessed on 23 February 2022.
- Marais AJ, Fennessy S, Ferguson S, Fennessy J (2019) *Country Profile: Republic of Angola - Giraffe Conservation Status Report February 2019*. Windhoek, Namibia: Giraffe Conservation Foundation.
- Mathews AJ, Flynn KC (2018) Supporting Experiential Learning With No-Cost Digital Tools: A Comprehensive GPS Lesson. *The Geography Teacher* 15(3): 117-128.
- Mendelsohn J, Mendelsohn S (2018) *SUDOESTE DE ANGOLA*. Retrieved from <http://id.loc.gov/authorities/names/no2007149181> on 18 August 2020.
- Miller KK (2009) Human dimensions of wildlife population management in Australasia – history, approaches and directions. *Wildlife Research* 36: 48-56.
- Ministério do Ambiente (2015) Estudo das comunidades do Parque Nacional do Iona: Relatório de Perfis das Comunidades. Retrieved from <https://www.quadrante-engenharia.pt/pt/projetos/ambiente/estudo-das-comunidades-no-parque-nacional-do-iona/> on 18 August 2020.
- Mir ZR, Noor A, Habib B, Veeraswami GG (2015) Attitudes of local people toward wildlife conservation: A case study from the Kashmir Valley. *JSTOR* 35(4): 392-400.
- Mogomotsi PK, Mogomotsi GEJ, Dipogiso K, Phonchitshekiso N. D, Stone LS, Badimo D (2020) An Analysis of Communities' Attitudes Toward Wildlife and Implications for Wildlife Sustainability. *Tropical Conservation Science* 13.
- Morais J, Castanho RA, Loures L, Pinto-Gomes C, Santos P (2019) Villagers' Perceptions of Tourism Activities in Iona National Park: Locality as a Key Factor in Planning for Sustainability. *Sustainability* 11(4448): 1-18.
- NACSO (2016) *The state of community conservation in Namibia - a review of communal conservancies, community forests and other CBNRM initiatives*. Retrieved from <http://www.met.gov.na/files/files/State-of-the-Parks-Report.pdf> on 19 August 2020.
- NACSO (2019) *Keep Namibia's wilfdlife on the Land!* Retrieved from http://www.nacso.org.na/sites/default/files/2019_Wildlife-on-the-land_rgb_F_201207s.pdf on 19 August 2020.
- Naidoo R, Weaver LC, De Longcamp M, Du Plessis P (2011) Namibia's community-based natural resource management programme: An unrecognized payments for ecosystem services scheme. *Environmental Conservation* 38(4): 445-453.
- Nuulimba K, Taylor JJ (2015) 25 years of CBNRM in Namibia: A retrospective on accomplishments, contestation and contemporary challenges. *Journal of Namibian Studies: History Politics Culture* 18: 89-110.
- Nyhus PJ (2016) Human-Wildlife Conflict and Coexistence. In *Annual Review of Environment and Resources* 41.
- O'Connor D, Stacy-Dawes J, Muneza A, Fennessy J, Gobush K, Chase MJ *et al.* (2019) Updated geographic range maps for giraffe, *Giraffa* spp., throughout sub-Saharan Africa, and implications of changing distributions for conservation. *Mammal Review* 49(4): 1-15.
- Pamela MH, Lynn RK (1988) A structural equation test of the value-attitude-behavior hierarchy. *Journal of Personality and Social Psychology* 54(4): 638-646.
- Pate J, Manfredo MJ, Bright AD, Tischbein G, Pate J, Manfredo MJ *et al.* (1996) Coloradans' attitudes toward reintroducing the gray wolf into Colorado. *Wildlife Society Bulletin* 421-428.
- Røskraft E, Ha B, Bjerke T, Kaltenborn BP (2007) Human attitudes towards large carnivores in Norway. *Wildlife Biology* 12: 172-185.
- Ruppert K (2020) *Human-Giraffe Interactions: Characterizing Poaching and Use of Parts as a Threat to Giraffe in Northern Kenya*. PhD thesis, University of Maine.
- Ryo S, Susan K, Ueda G (2014) Public Perceptions of Significant Wildlife in Hyogo, Japan. *Human Dimensions of Wildlife* 19(1): 88-95.
- Sampson C, Leimgruber P, Rodriguez S, McEvoy J, Soherden E, Tonkyn D (2019) Perception of Human-Elephant Conflict and Conservation Attitudes of Affected Communities in Myanmar. *Tropical Conservation Science* 12(1): 1-17.
- Sarrazin F, Barbault R (1996) Reintroduction: challenges and lessons for basic ecology. *Trends in Ecology & Evolution* 11(11): 474-478.
- Sogbohossou E, Kassa B, Aboibacar Z, Mahamane A (2013) Human-Giraffe conflicts in the central Range of the giraffe (*Giraffa camelopardalis peralta* Linnaeus 1758) in Niger. *Annals of Agronomic Sciences* 17(2).
- Weinmann S (2018) *Impacts of Elephant Crop-Raiding on Subsistence Farmers and Approaches to Reduce Human-Elephant Farming Conflict in Sagalla, Kenya*. Masters degree, University of Montana, USA.
- Williams VL, Loveridge AJ, Newton DJ, Macdonald DW (2017) Questionnaire survey of the pan-African trade in lion body parts. *PLoS one* 12(10): 1-35.